



PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in the Packing and Preserving of Concentrated Tomatoes

We, SOCIÉTÉ CONGOLAISE DE PERSONNES à RESPONSABILITÉ LIMITÉE NOGUEIRA & CIE, of Leopoldville, Congo Republic, (Léo), a Company registered under the laws of the Congo Republic, (Léo), do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

THIS INVENTION relates to a process and package for the packaging of concentrated tomatoes for conservation.

The expression "concentrated tomatoes" or "tomato concentrate", as used in this specification, refers to tomatoes formed into purée (by being boiled to a pulp and passed through a sieve) and then subjected to the usual operations for concentration by evaporation of water and removal of gas.

Such packages are, generally, constituted by hermetically closed tin-plate boxes, subjected in an oven to various temperatures from 35° to 70°C., and it has been found that the concentrated tomatoes have clearly turned brown or sienna.

Most metal boxes on the market have not therefore been considered perfect or even suitable.

Also, the metal packages do not enable the contents to be seen. Further, they are of a fairly high cost.

The present invention has for an object to determine the minimal and indispensable conditions for producing packages which will maintain the quality of the concentrated tomatoes, and will notably conserve to the latter their natural red colour, their smell and their taste.

It also has for its object to provide transparent packages satisfying these conditions, of a minimum cost price, and able to with-

stand the conditions of transport and storage in tropical countries.

To determine with exactitude the necessary and sufficient conditions which must be fulfilled in order to attain the objects of the invention, a certain number of experiments have had to be carried out.

Numbers of plastics and sealed packages containing concentrated tomatoes have been exposed to sunlight, to ultra-violet rays, and also to temperatures of 38°C. to 70°C.

After a certain lapse of time, varying with the nature of the material, the contents of all these packages, originally of a natural red, turn brown perceptibly, and attain, after a period of 15 days, a colour generally sienna.

It was therefore not apparently possible to realize a package made of plastic, which would be convenient for concentrated tomatoes in the imposed conditions.

Research has been made for the causes of this alteration in colour.

It is first apparent that the action of sunlight can be disregarded, for the sachets or bags exposed to heat in the dark browned very much more quickly than those under ultra-violet rays, or exposed to the sun's rays.

In order to verify whether this phenomenon of browning was connected exclusively with the employment of plastic, experiments were made by packing concentrated tomatoes in an hermetically closed glass flask. These flasks were exposed to sunlight, and put in a warm stove, at 38°C., at 50°C., at 60°C., and at 70°C.

After some hours at 70°C., and 2 days at 38°C., the contents of the flasks had unquestionably browned. Nevertheless, the phenomena occurred more slowly than in the plastic sachets. It may therefore be concluded that the first cause of the browning

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was independent of the packaging in plastic, but that this, according to its nature or composition, may accelerate the browning reaction.

Since the diverse plastic materials used present different permeabilities to water vapour, oxygen, nitrogen and carbon dioxide, the hypothesis was suggested that certain gases occluded in the concentrate at first, and capable of passing through the plastic sachet, must be the real causes of browning.

In order to verify this hypothesis, some of the concentrated tomatoes were placed in a glass flask and fully freed from gas under a vacuum of 730 to 740 mm. of mercury. These flasks, maintained under vacuum, were exposed all round to sunlight and heated in the stove at 38°C., 50°C., 60°C., and 70°C. At the same time, the concentrated tomatoes were exposed to 70°C. in their original package, that is to say, in the sheet-metal box.

After 24 hours of exposure under these conditions, the concentrated tomatoes in the glass flasks had retained their original colour, but, on the contrary, those in the sheet-metal box had distinctly browned.

When the glass flasks were exposed to sunlight and to temperatures of 38°C. to 50°C., they did not show browning after 4 weeks.

On the other hand, into another series of flasks, containing concentrated tomatoes previously freed from gases, either air, oxygen or nitrogen was reintroduced. After some hours of exposure at 50°C. the browning appeared, and the concentrate in the flask with a supply of oxygen took on a pronounced sienna tint.

In conclusion, it is therefore indispensable, if it is wished to stabilize the tint of the concentrated tomatoes, on the one hand to eliminate the air or the occluded gases originally contained in the tomatoes, and, on the other hand, to prevent such bases subsequently re-entering.

After this, research was made for a transparent and plastic material having the strongest impermeability to the gases.

The materials obtainable did not have all the required qualities. It is necessary to have a barrier material having an impermeability to gas and also to water vapour, to guard against any loss of weight.

Finally, the concentrated tomatoes with gas removed were introduced into sachets made of composite plastic material, having complete impermeability to gases and to vapour, and able to withstand a temperature of at least 90°C. These sachets were sealed and subsequently subjected to trials of aging, and to heat in darkness, and to light and heat together. The results have been convincing, and browning has not been noted. Nevertheless, certain sachets swelled up after some days. The withdrawal of the gas contained inside the sachets revealed the presence of

CO₂. There is thus an anaërobie fermentation, the aerobic microbes having been destroyed from the temperature of 35°C. To obviate this defect, other sachets conditioned as described above were subjected in the oven to 90°C. for 2 hours. After several weeks of exposure, no fermentation was noted.

From these different trials and observations, it is deduced that to provide a perfect packaging for concentrated tomatoes, it is sufficient:

- 1) to remove the gas from the product;
- 2) to place the product, free from gas and air, in a material impermeable to gas and to water vapour;
- 3) to sterilize by heating the package and its contents to a temperature sufficient to destroy the bacteria.

Packages containing concentrated tomatoes thus treated are preserved practically indefinitely.

For a better understanding of the invention a practical embodiment will now be described.

A quantity of concentrated tomatoes is previously freed from gas under a vacuum of 730 to 740 mm. of mercury.

Manipulated under this vacuum, it is introduced into a practically impermeable package, which may be of metal, or of glass, the latter of which has the advantage of being transparent, whereby the concentrated tomatoes can be seen with their natural red colour.

Nevertheless, these packages of metal or of glass are expensive, and are rather heavy for transportation, necessitating the payment of substantial transportation costs.

It is more advantageous to choose a material, such as plastic material, of little weight, transparent, and satisfying the conditions of impermeability to gases and vapour, and of resistance to heat.

One such package, for example, among others satisfying these conditions, is embodied in the form of sachets of which the walls comprise, between two layers of a synthetic plastic material marketed under the trade mark "Cellophane", a layer of varnish and a layer of microcrystalline wax. These layers are welded in the form of sachets hermetically sealed by known means, after having been filled, under vacuum, with concentrated tomatoes.

After this, they are subjected to heating, to about 90°C. for example, to destroy the microbes.

Packages of this latter type not only permit the red colour of the concentrated tomatoes, conserved indefinitely even in tropical countries, to be seen, but also retain to the tomato its smell and good taste.

They have an agreeable presentation and are easy to handle. Their light weight permits smaller freight charges. They can be transported in cases or cartons of wood. They

- are simple to open, and avoid the danger of injury when cutting open metal boxes. Their journey to tropical countries is eased, and good preservation in these countries is ensured. They avoid oxidation for a time when open; and the concentrated tomatoes thus treated can be easily conserved in cold storage without alteration to the colour or the taste.
- As previously noted, the process according to the invention improves the packaging in metal or glass of concentrated tomatoes, in view of the perfect conservation of their colour and their taste.
- WHAT WE CLAIM IS:—**
1. A process for packing and preserving concentrated tomatoes, comprising the steps of: removing air or other gases from the concentrate, placing the degasified concentrate in a container which is impermeable to gases and to water vapour, and sterilising the container and its contents by heating them to a temperature sufficient to destroy any bacteria contained therein.
 2. A process for packing and preserving concentrated tomatoes as claimed in claim 1, wherein the removal of air or other gases is carried out in a vacuum of from 730 to 740 millimetres of mercury.
 3. A process for packing and preserving concentrated tomatoes as claimed in claim 1 or 2, wherein the container and its contents are heated to a temperature of about 90°C. for the destruction of bacteria.
 4. An impermeable container containing degasified and sterilised concentrated tomatoes prepared by the process claimed in claim 1, 2 or 3.
 5. A container containing concentrated tomatoes as claimed in claim 4, wherein the container is made of tin-plate or other metal.
 6. A container containing concentrated tomatoes as claimed in claim 4, wherein the container is made of transparent glass.
 7. A container containing concentrated tomatoes as claimed in claim 4, wherein the container is a composite sachet including layers of synthetic plastic materials affording complete impermeability to the passage of gases and water vapour.
 8. A container containing concentrated tomatoes as claimed in claim 7, wherein the container is a composite sachet consisting of two layers of a synthetic plastic material, between which are located a layer of varnish and a layer of microcrystalline wax, these layers being welded into the form of sachets after being filled with the concentrated tomatoes.
 9. A container for use in the packing and preservation of concentrated tomatoes, the container being a composite sachet consisting of two layers of synthetic plastic material which is impermeable to gases and to water vapour, between which are located a layer of varnish and a layer of microcrystalline wax, all these layers being capable of withstanding a temperature of about 90° C.
 10. A process for packing and preserving concentrated tomatoes, substantially as hereinbefore described.
 11. A container containing concentrated tomatoes, prepared and treated substantially as hereinbefore described.

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